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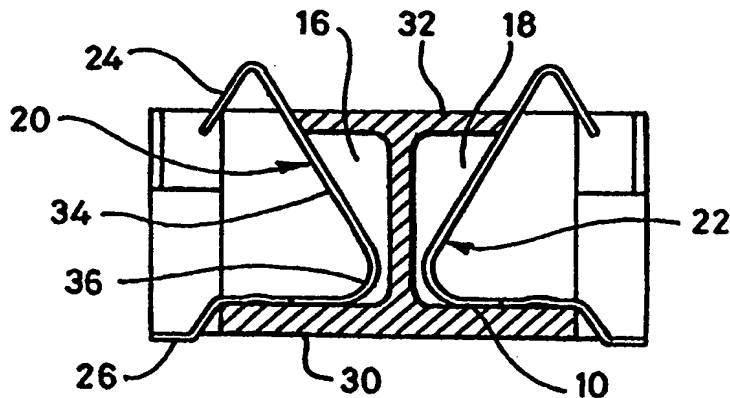
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<p>(21) International Application Number: PCT/GB96/01534</p> <p>(22) International Filing Date: 26 June 1996 (26.06.96)</p> <p>(30) Priority Data: 9513540.6 4 July 1995 (04.07.95) GB</p> <p>(71) Applicant (for all designated States except US): AVX LIMITED [GB/GB]; Exning Road, Newmarket, Suffolk CB8 0BB (GB).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): BISHOP, Peter, George [GB/GB]; 14 Church Lane, Isleham, Ely, Cambridgeshire CB7 5SQ (GB).</p> <p>(74) Agent: KEITH W. NASH & CO.; 90-92 Regent Street, Cambridge CB2 1DP (GB).</p>	<p>(81) Designated States: GB, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report.</p>	

(54) Title: ELECTRICAL CONNECTORS

(57) Abstract

An electrical connector for connecting two adjacent boards (eg. printed circuit boards) comprising an electrically insulating body (10; 58) on which are mounted conducting elements (20, 22; 50). Each element has a first portion (24; 69) for electrically contacting a part of one board, and a second portion (26; 74) for contacting a part of the adjacent board, so as to provide electrical connection therebetween. The insulating body (10) may lie between the boards to be interconnected.



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Title: ELECTRICAL CONNECTORS**Field of Invention**

The present invention relates to electrical connectors and more particularly to electrical connectors used to interconnect electronic assemblies such as, for example, printed circuit boards, which are required to be mounted one adjacent another, often, but not necessarily, in a vertically-arranged stack. Such electronic assemblies will be referred to herein as "boards".

Background to the Invention

Apart from hard wiring the boards one to another, prior art methods of interconnecting the boards include the use of edge connectors carried by the boards which engage with complementary fixed connectors carried within a frame mounting the boards, interconnection being required between the complementary fixed connectors to provide the necessary connections from one board to another.

Such systems are inconvenient and costly, requiring numerous individual component parts, and the assembly of those parts into an interconnection system. In addition, removal or replacement of individual boards of an assembly is likely to be difficult and thus introduce further cost in service and maintenance.

It is an object of the present invention to provide an improved means of interconnecting boards as herein defined.

Summary of the Invention

According to the present invention electrical connection means for interconnecting two physically adjacent boards, as herein defined, comprises an electrically insulating body which mounts one or more electrically conducting elements, each such conducting element having a first portion adapted to electrically contact an electrically conducting part of one

board, and a second portion adapted to contact an electrically conducting part of an adjacent board, to provide electrical connection therebetween.

One of said portions may be adapted to be physically attached to the electrically conducting part of its respective board, and the other of said portions to form a pressure contact with the electrically conducting part of the other board.

Alternatively the body of the connector may be physically attached to, or located upon, one or other of the two boards and pressure contact made by both portions of the connector element to the respective conducting parts of the two boards.

In one form of connector in accordance with the invention, the insulating body of the connector may lie between the boards to be interconnected, and connection may be made between contacts carried respectively by the opposed faces of the two boards.

In a further form, the boards to be interconnected may lie one upon the other, and connection may be made between contacts carried respectively upon the upper faces of the two boards.

Employing a series of connectors in accordance with the invention, a series of boards may be interconnected in stack without the need for an external mechanical framework or associated interconnections.

It will be apparent that connectors in accordance with the invention provide a more ready and less expensive means of interconnecting adjacent boards one to another, and of creating an interconnected stack of a series of such boards.

Brief description of drawings:

In order that features and advantages of the present invention may be further appreciated, two embodiments thereof will be described, by way of example, with reference to the accompanying drawings of which:

Figure 1, 2 and 3 show respectively views from the top, side and below of an electrical connector in accordance with the invention:

Figure 4 is a transverse section through the connector of Figures 1, 2 and 3, taken along the line A-A, looking in the direction of the arrows;

Figure 5 is a transverse section of another form of connector in accordance with the invention;

Figures 6 & 7 are views of the connector of Figure 5 from one side and below respectively, on a different scale; and

Figure 8 is a further transverse view of the connector of Figure 5 assembled with, and interconnecting two boards.

Detailed description of embodiments

Referring to Figures 1 to 4, the first electrical connector comprises a body 10 of electrically insulating material in the form of a plastics moulding, whose opposed longitudinal faces 12 and 14 are each provided with a series of opposed recesses, such as 16 and 18 respectively (see Figure 4), in which identical contact elements such as 20 and 22 are mounted.

The body 10 may typically be moulded of STANYL (TM) high temperature resistant nylon 46, and the contact elements 20 formed of beryllium-copper strip material 0.1mm thick.

Each contact element is shaped to provide a head 24 in the form of an inverted letter V at the upper extremity of the contact element and a flat foot 26 at the lower extremity.

Head 24, which is intended to make pressure contact with a contact pad upon one printed circuit board, is gold plated to optimise electrical contact between contact element 20 and the respective contact pad, carried upon the board to be mounted adjacent the upper face 32 of body 10.

Foot 26, which is intended to be surface mounted by soldering to a contact pad upon the other printed circuit board, is tinned with a tin-lead alloy to permit ready attachment thereto.

Each contact element 20 is shaped and mounted to permit head 24 to flex outwardly and downwardly upon stem 34, about turnover 36. when assembled with an upper printed circuit board, the lower face of which will lie in contact with the upper face 32 of moulding 10, when the upper board is pressed into contact with the connector.

Referring now to the further connector shown in Figures 5 to 8 of the drawings, a series of contact elements 50, are mounted within recesses 52 arranged in two opposed rows 54 and 56, one on each side of a body moulding 58 of electrically insulating material.

Each contact element 50 comprises a generally V-shaped portion, one limb 60 of which lies in contact with the upper face of the recess 52, and the other 62 partly projects through the aperture slot 64 in the lower face of recess 52.

The end-portion of limb 60 is continued and stepped to provide a foot 66, intended to be surface mounted upon a complementary contact carried by one of the two boards to be interconnected, and the end portion 68 of limb 62 is bent upwardly toward the recess 52, to provide a sprung contact face 69 to engage a complementary contact carried by the other of the two boards to be interconnected.

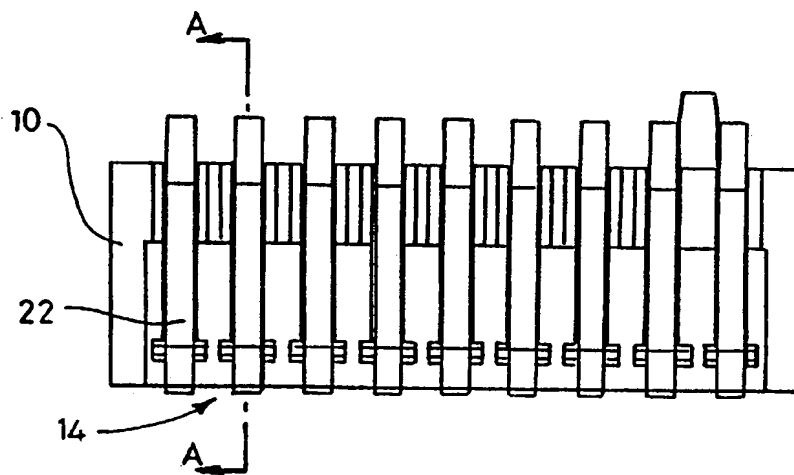
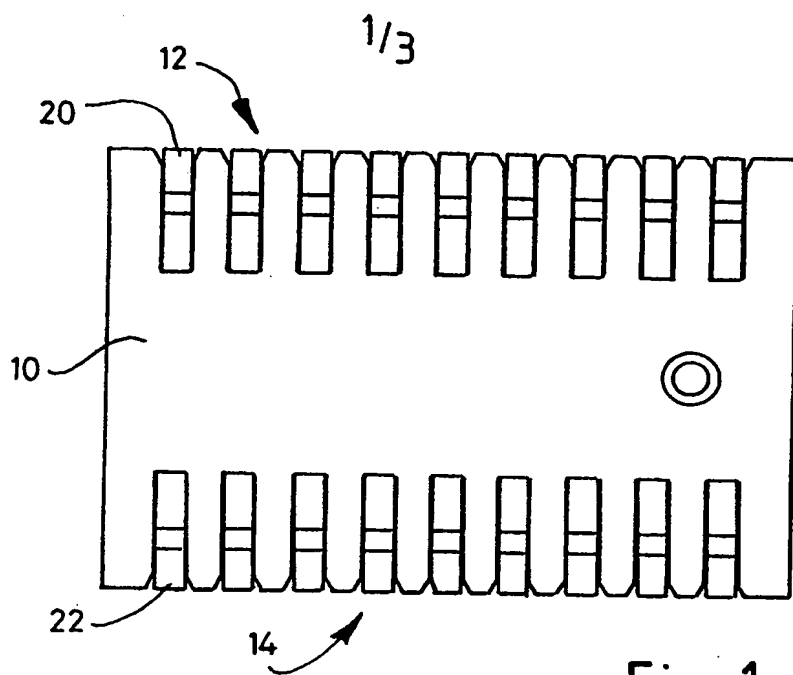
Figure 8 shows the same connector assembled with a pair of boards 70 and 72, with appropriately positioned contact pads 74 and 76 respectively, on the upper surface of each, to permit interconnection by means of the contact elements 50.

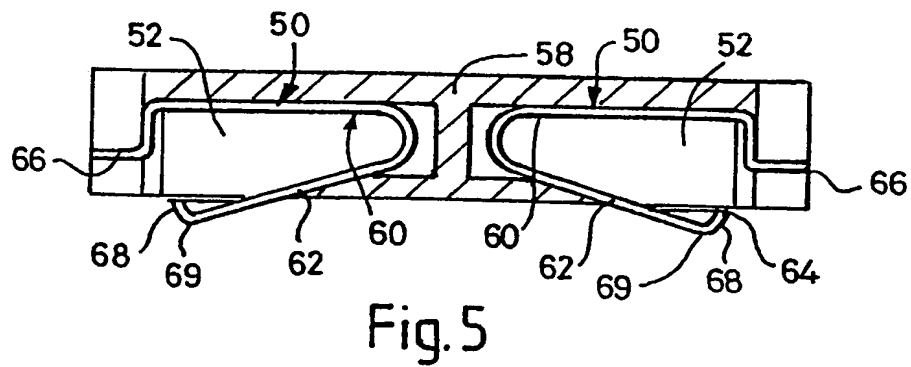
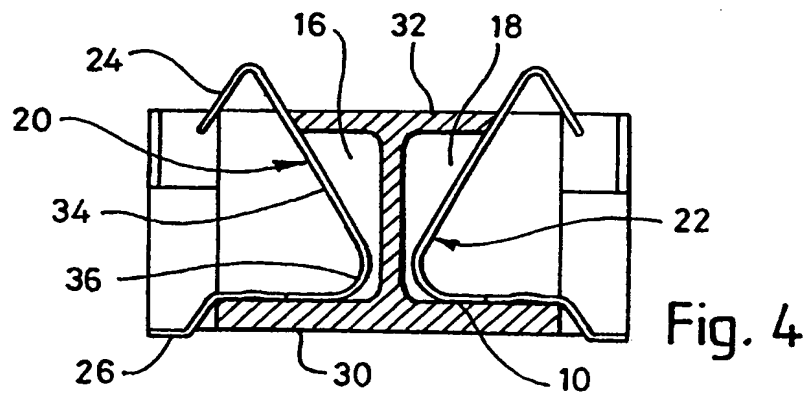
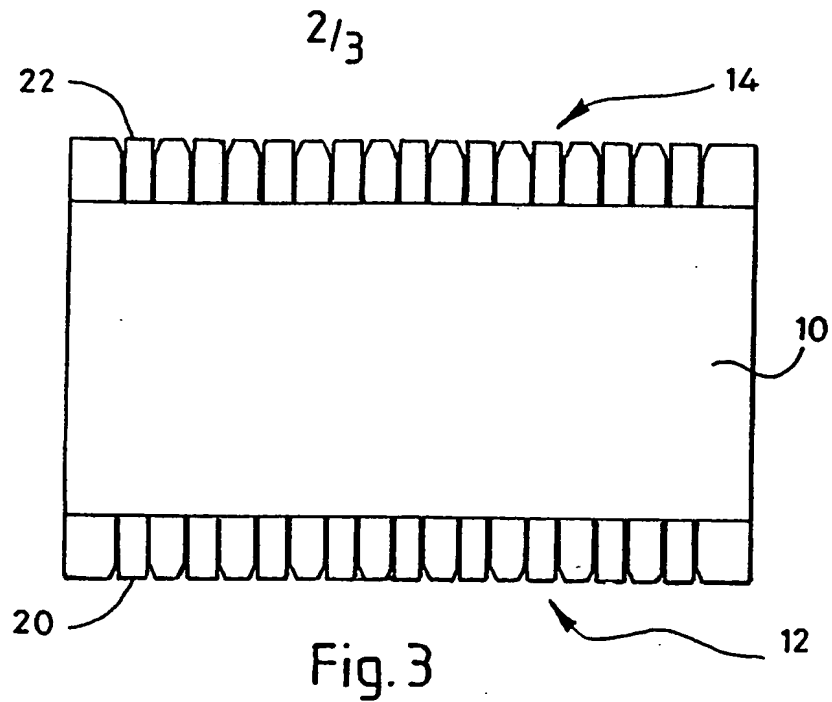
The end portion 68 of each contact element 50 projects through aperture 64, and allows contact faces 69 to contact pads 76 upon the upper face of board 72, the lower part of connector body 58 projecting through an appropriately dimensioned aperture in the upper board 70, to mechanically contact the upper face of lower board 72.

It will be appreciated that the connector described in relation to Figures 5 to 8 of the drawings will normally be carried upon the upper board 70 by virtue of the contact feet 66 being surface mounted by solder attachment to contact pads 74, and, upon assembly of the two boards 70 and 72, contact faces 69 will engage pads 76 upon the lower board 72. The complete assembly may be held together by appropriately mounting board 70 to board 72, for example by interengaging pegs and apertures, or otherwise.

CLAIMS

1. An electrical connector for interconnecting two physically adjacent boards, as herein defined, comprising an electrically insulating body which mounts one or more electrically conducting elements, each such conducting element having a first portion adapted to electrically contact an electrically conducting part of one board, and a second portion adapted to contact an electrically conducting part of an adjacent board, to provide electrical connection therebetween.
2. An electrical connector according to claim 1 in which one portion is adapted to be physically attached to the electrically conducting part of its respective board, and the other of said portions to form a pressure contact with the electrically conducting part of the other board.
3. An electrical connector according to claim 1 in which the body of the connector is physically attached to or located upon one or other of the two boards, and in which pressure contact is made by both portions of the connector element to the respective conducting parts of the two boards.
4. An electrical connector according to any one preceding claim in which the insulating body of the connector lies between the boards to be interconnected, and connection is made between contacts carried respectively by the opposed faces of the two boards.
5. An electrical connector according to any one of claims 1 to 3 in which the boards to be interconnected lie one upon the other, and connection is made between contacts carried respectively upon the upper faces of the two boards.
6. An electrical connector for interconnecting two physically adjacent boards substantially as herein described with reference to, and as shown in, Figures 1 to 7 of the accompanying drawings.





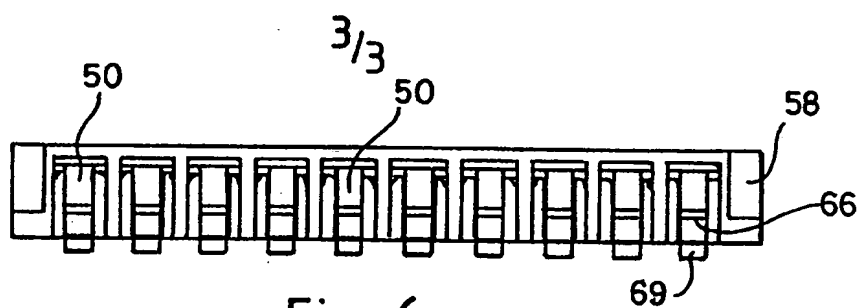


Fig. 6

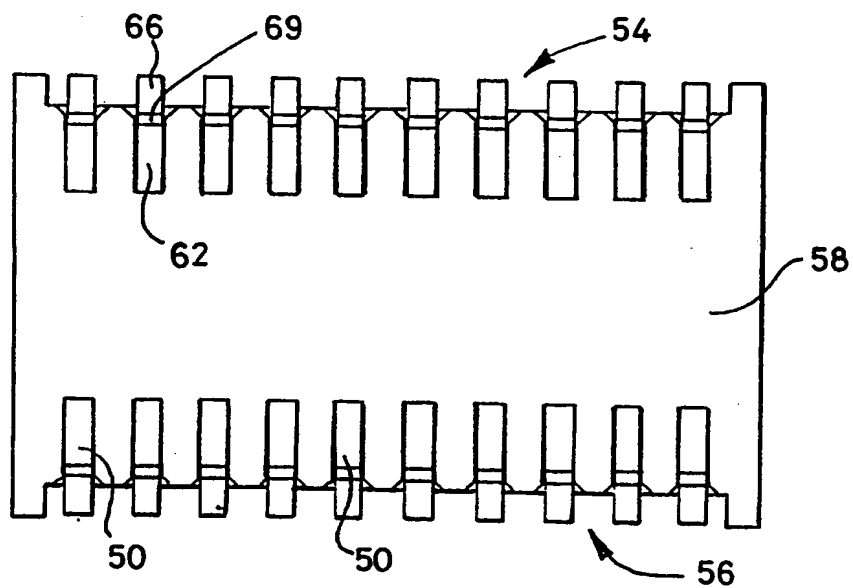


Fig. 7

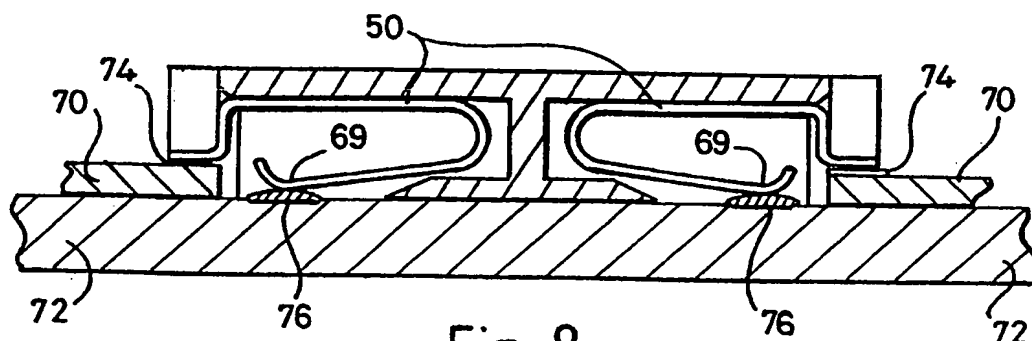


Fig. 8

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